

Name \_\_\_\_\_

## STUDY GUIDE: Ecology

1. The scientific study of interactions among organisms and their environment is called \_\_\_\_\_. All of the organisms that live together, interacting with their physical environment are known as a/an \_\_\_\_\_. The part of Earth in which life exists, including land, water, and the atmosphere is called the \_\_\_\_\_.
2. Living components in the environment are called \_\_\_\_\_ factors, and include other organisms like predators, food sources, and competitors. Chemical and physical components of the environment are called \_\_\_\_\_ factors. Examples of these nonliving factors include sunlight, \_\_\_\_\_, \_\_\_\_\_, pH, \_\_\_\_\_, and soil type.
3. A/an \_\_\_\_\_ is a group of similar organisms that can breed and produce fertile offspring. A/an \_\_\_\_\_ is a group of different, interacting species that live in the same area. A/an \_\_\_\_\_ is a group of individuals of the same species that live in the same area. A group of ecosystems that share similar climates and typical organisms is called a/an \_\_\_\_\_. They are grouped \_\_\_\_\_.
4. The \_\_\_\_\_ has soil that is thin and nutrient poor, is hot and very wet, and is home to more species than all of the other biomes combined. The \_\_\_\_\_ also has thin, nutrient poor soil, but is very dry with hot days and cold nights. The \_\_\_\_\_ is also hot and has a dry season and a wet season.
5. The biome where we live that has fertile soil and deciduous and coniferous trees is the \_\_\_\_\_. The other biome with fertile soil but has lots of lush grasses is the \_\_\_\_\_. The \_\_\_\_\_ has thin soil that is perpetually frozen and has long, cold dark winters with strong winds. The \_\_\_\_\_ is also known as the taiga or boreal forest.
6. The sunlit region near the surface of aquatic ecosystems where photosynthesis can occur is called the \_\_\_\_\_ zone. The dark layer of water where sunlight does not penetrate, preventing photosynthesis, is called the \_\_\_\_\_ zone. The region where organisms live attached to or near the bottom of the water is called the \_\_\_\_\_ zone.
7. Flowing freshwater ecosystems like \_\_\_\_\_ and streams are classified as \_\_\_\_\_, while standing water ecosystems like \_\_\_\_\_ and ponds are classified as \_\_\_\_\_. Water covers the soil for at least part of the year in \_\_\_\_\_ like bogs, marshes, and swamps.
8. Explain 3 reasons wetlands are important aquatic ecosystems.
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9. Wetlands formed where a river meets the sea are called \_\_\_\_\_. They contain a mixture of \_\_\_\_\_ and \_\_\_\_\_ water, so plants living there must be salt tolerant!

10. In marine ecosystems, the \_\_\_\_\_ zone exists between low and high tide, so organisms living there must be able to survive when submerged in saltwater AND when exposed to air and sunlight. The \_\_\_\_\_ ocean makes up more than 90% of the ocean's area. The \_\_\_\_\_ ocean is brightly lit and has lots of nutrients. It is the home to many kelp forests and coral reefs.

11. Organisms that make their own food by capturing energy from sunlight or chemicals are called \_\_\_\_\_, or producers. Phototrophs produce energy from \_\_\_\_\_, while chemotrophs use \_\_\_\_\_ sources. Although most green plants are producers, some plants like the \_\_\_\_\_ are actually heterotrophs!

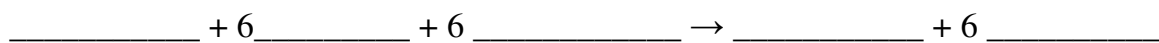
12. Organisms that feed on other live organisms for carbon and energy are called \_\_\_\_\_. Organisms that obtain their nutrients and energy by feeding on the remains of dead organisms are called \_\_\_\_\_. Decomposers like \_\_\_\_\_ and \_\_\_\_\_ are specialized detritus feeders that recycle nutrients.

13. Give at least 2 examples of each of the following:

- Primary consumers: \_\_\_\_\_ and \_\_\_\_\_
- Secondary consumers: \_\_\_\_\_ and \_\_\_\_\_
- Tertiary consumers: \_\_\_\_\_ and \_\_\_\_\_

14. \_\_\_\_\_ feed only on plant material. \_\_\_\_\_ feed only on other animals. \_\_\_\_\_ feed on both plants and animals. \_\_\_\_\_ feed on dead and decaying plant or animal material. Some examples of scavengers would be \_\_\_\_\_ and \_\_\_\_\_.

15. All food chains and webs must start with \_\_\_\_\_. Energy can be converted from \_\_\_\_\_ to \_\_\_\_\_ by photosynthetic organisms using the following equation:



16. Only \_\_\_\_\_% of the energy consumed by an organism is passed through each trophic level from one organism to another because some is broken down to do \_\_\_\_\_ and some is lost as \_\_\_\_\_. The total amount of living tissue within a given trophic level is called \_\_\_\_\_. There has to be more energy at the \_\_\_\_\_ of the biomass pyramid (with the producers) to support the organisms at the \_\_\_\_\_ (like the higher-level consumers).

17. Draw a food web using the following organisms: grass, fox, mouse, rabbit, coyote, mushroom  
*NOTE: Trace the flow of energy by including all necessary arrows and be sure that they are pointing in the correct direction.*

18. Fill in the missing steps of the water cycle, in order.

- 1) Water enters the atmosphere through \_\_\_\_\_ or \_\_\_\_\_
- 2) Clouds form through \_\_\_\_\_
- 3) Water returns to Earth's surface through \_\_\_\_\_
- 4) Water flows along the surface as \_\_\_\_\_ or becomes part of the groundwater through \_\_\_\_\_
- 5) Water re-enters the atmosphere and the cycle starts over

19. During photosynthesis, plants absorb \_\_\_\_\_ and release \_\_\_\_\_. During respiration, organisms use \_\_\_\_\_ and release \_\_\_\_\_. In the nitrogen cycle, bacteria absorb nitrogen gas and convert it into a more usable form through \_\_\_\_\_. Other bacteria eventually convert it back into nitrogen gas through \_\_\_\_\_.

20. Extra nutrients from fertilized fields harm surrounding aquatic ecosystems because they cause \_\_\_\_\_ to grow, which blocks \_\_\_\_\_, killing underwater plants. Bacteria then grow and use up \_\_\_\_\_ as they break down excess detritus, causing fish to suffocate and \_\_\_\_\_.

21. The range of environmental factors in which organisms can survive and reproduce is called the range of \_\_\_\_\_. The \_\_\_\_\_ range supports maximum growth, while conditions in the zones of \_\_\_\_\_ are tolerable but not optimal. If even one factor is beyond the limits of tolerance, \_\_\_\_\_ occurs.

22. The general place where an organism lives is its \_\_\_\_\_. The range of conditions in which the organism lives and the way it uses those conditions is called its \_\_\_\_\_. According to the \_\_\_\_\_ principle, no two species can occupy the same niche in the same habitat at the same time.

23. A species whose role is essential for the survival of many other species in an ecosystem is called a/an \_\_\_\_\_ species. Species \_\_\_\_\_ leads to ecosystem stability.

24. Give 2 examples of keystone species and explain how they are important to the survival of other organisms in their ecosystem.

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25. Ticks, fleas, and tapeworm are examples of \_\_\_\_\_ because they take nutrients from a host. A relationship in which one species benefits and the other is neither helped nor harmed is called \_\_\_\_\_.

26. Give 2 different examples of organisms that exhibit mutualism and explain each of their roles in their relationship.

- \_\_\_\_\_ and \_\_\_\_\_
  - Explanation:
  
- \_\_\_\_\_ and \_\_\_\_\_
  - Explanation:

27. The change in species that occupy an ecosystem due to fires, pollution, and other natural or human disturbances is called \_\_\_\_\_. \_\_\_\_\_ succession occurs in an area in which no trace of a previous community is present, such as after volcanic eruptions or retreating glaciers. The first species to colonize such barren areas is called a/an \_\_\_\_\_ species. \_\_\_\_\_ succession occurs in areas that were only partially destroyed by disturbances such as wildfires, hurricanes, and logging. The last stage in ecological succession is known as a/an \_\_\_\_\_ ecosystem, when populations of all organisms are in balance with each other and with existing abiotic factors.

28. \_\_\_\_\_ refers to the number of individuals per unit area. Birthrate and death rate both affect population growth, as does \_\_\_\_\_, which is the movement of individuals *into* an area, and \_\_\_\_\_, which is the movement of individuals *out of* an area.

29. A J-shaped growth curve displays \_\_\_\_\_ growth, where the larger a population gets, the faster it grows. However, this type of growth cannot last forever, so the population eventually \_\_\_\_\_. An S-shaped growth curve displays \_\_\_\_\_ growth. The population stabilizes at its \_\_\_\_\_, or the maximum number of individuals of a species that can be supported by that environment.

30. \_\_\_\_\_ factors control the growth of a population and determine the carrying capacity by limiting growth and reproduction. Competition, predation, herbivory, parasitism, and disease are examples of density-\_\_\_\_\_ limiting factors, while unusual weather and natural disasters are examples of density-\_\_\_\_\_ limiting factors.

Be sure you can also

- Compare and contrast biomes
- Create and analyze population density graphs by interpreting and explaining their
  - Optimal range
  - Zones of stress
  - Range of tolerance
- Explain the trends in graphs of predator and prey populations
- Compare and contrast exponential and logistic growth curves
  - Label carrying capacity